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PTO/SB/21 (08-03)

Approved for use through 08/30/2003. OMB 0651-0031
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/708,207	
	Filing Date	02/17/2004	
	First Named Inventor	Chia-Chang Lee	
	Art Unit		
	Examiner Name		
Total Number of Pages in This Submission	3	Attorney Docket Number	YOIP0003USA

ENCLOSURES (Check all that apply)

<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input checked="" type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance communication to Technology Center (TC) <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please Identify below):
Remarks		
Response to the office action has been sent to the examiner by fax on 12/04/2003		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Winston Hsu, Reg. No.: 41,526
Signature	
Date	3/12/2004

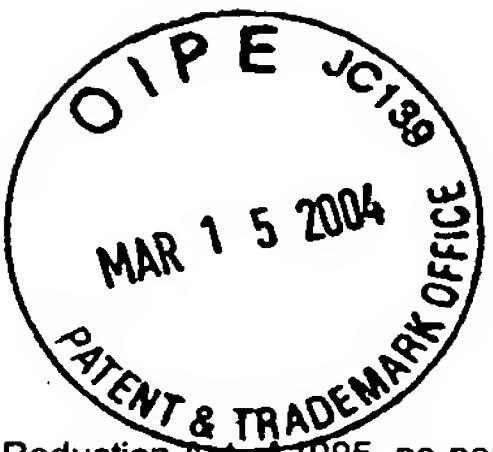
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PTO/SB/17 (10-03)

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

 Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 0.00)

Complete if Known

Application Number	10/708,207
Filing Date	02/17/2004
First Named Inventor	Chia-Chang Lee
Examiner Name	
Art Unit	
Attorney Docket No.	YOIP0003USA

METHOD OF PAYMENT (check all that apply)

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1)		(\$ 0.00)	

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	=
Multiple Dependent	- 3** =	X	=

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 86	2201 43	Independent claims in excess of 3
1203 290	2203 145	Multiple dependent claim, if not paid
1204 86	2204 43	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent
SUBTOTAL (2)		(\$ 0.00)

**or number previously paid, if greater; For Reissues, see above

3. ADDITIONAL FEES

Large Entity	Small Entity	Fee Description	Fee Paid
Fee Code (\$)	Fee Code (\$)		
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for ex parte reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 0.00)

SUBMITTED BY

(Complete if applicable)

Name (Print/Type)	Winston Hsu	Registration No. (Attorney/Agent)	41,526	Telephone	886289237350
Signature					
		Date	3/12/2004		

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PTO/SB/02B (11-00)

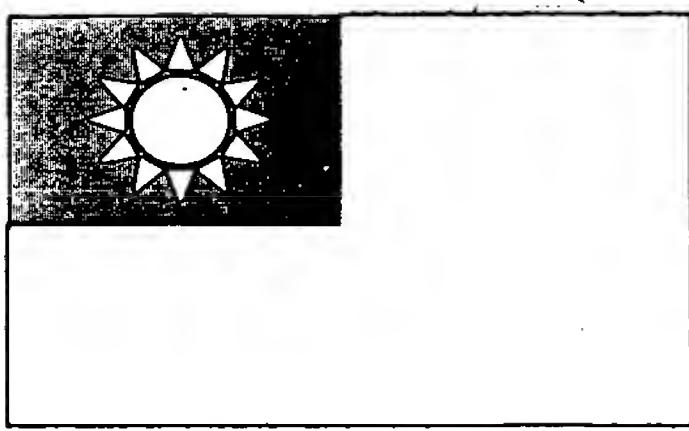
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DECLARATION --- Supplemental Priority Data Sheet

Additional foreign applications:

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Y01-003

中華民國經濟部智慧財產局

INTELLECTUAL PROPERTY OFFICE
MINISTRY OF ECONOMIC AFFAIRS
REPUBLIC OF CHINA

茲證明所附文件，係本局存檔中原申請案的副本，正確無訛，
其申請資料如下：

This is to certify that annexed is a true copy from the records of this office of the application as originally filed which is identified hereunder:

申 請 日 : 西元 2003 年 02 月 24 日
Application Date

申 請 案 號 : 092203137
Application No.

申 請 人 : 揚明光學股份有限公司
Applicant(s)

局 長
Director General

A handwritten signature in Chinese characters, likely belonging to the Director General, is placed below the title. To its right is a decorative cloud-like flourish.

發文日期：西元 2004 年 2 月 10 日
Issue Date

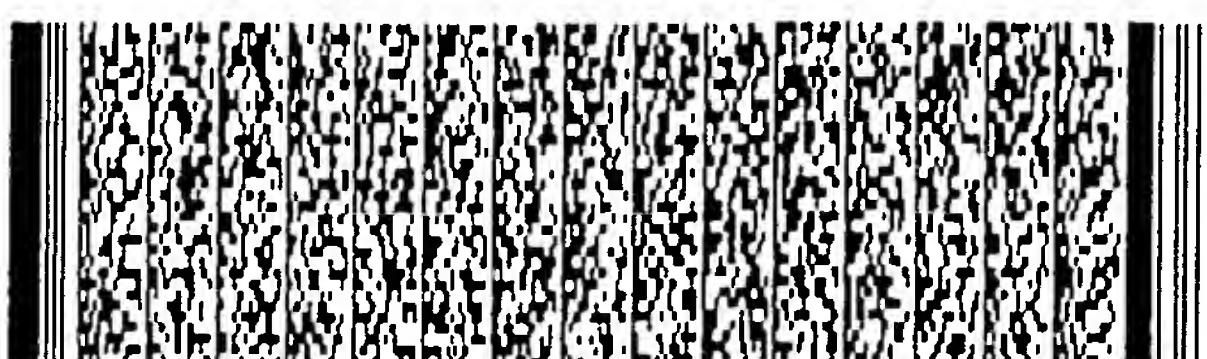
發文字號： 09320122070
Serial No.

申請日期 : FEB 24 2003	IPC分類
申請案號 :	

(以上各欄由本局填註)

新型專利說明書

一 、 新型名稱	中文	積分柱承托裝置
	英文	Holding apparatus for a rod
二 、 創作人 (共3人)	姓名 (中文)	1. 李嘉樟 2. 蔡智偉 3. 張景昇
	姓名 (英文)	1. Lee Chia Chang 2. Tsai Chih Wei 3. Chang Ching Sheng
	國籍 (中英文)	1. 中華民國 TW 2. 中華民國 TW 3. 中華民國 TW
	住居所 (中 文)	1. 新竹科學工業園區新竹市力行路11號 2. 新竹科學工業園區新竹市力行路11號 3. 新竹科學工業園區新竹市力行路11號
	住居所 (英 文)	1. No 11, Li Hsing Rd, Science-Based Industrial Park, Hsinchu, R.O.C. 2. No 11, Li Hsing Rd, Science-Based Industrial Park, Hsinchu, R.O.C. 3. No 11, Li Hsing Rd, Science-Based Industrial Park, Hsinchu, R.O.C.
三 、 申請人 (共1人)	名稱或 姓名 (中文)	1. 揚明光學股份有限公司
	名稱或 姓名 (英文)	1. Young Optics Inc.
	國籍 (中英文)	1. 中華民國
	住居所 (營業所) (中 文)	1. 新竹科學工業園區新竹市力行路11號 (本地址與前向貴局申請者相同)
	住居所 (營業所) (英 文)	1. No 11, Li Hsing Rd, Science-Based Industrial Park, Hsinchu, Taiwan, R.O.C.
代表人 (中文)	1. 莊謙信	
代表人 (英文)	1. Frank Chuang	



四、中文創作摘要 (創作名稱：積分柱承托裝置)

一種積分柱承托裝置，係設置於一積分柱外側，其包括一承托件，該承托件為一散熱基板且其外表面前具有鰭片結構，承托件與積分柱間之隙填充有導熱物質，使積分柱之熱量藉由導熱物質導出後，傳導至承托件再利用自然對流或強制對流方式將熱量帶走，而達到散熱效果，由於承托件具有較大之熱交換面積且導熱物質之傳導性能較氣體佳，故可大幅減少承托件與積分柱間之接觸熱阻，因此可提高散熱效率。

陸、英文創作摘要 (創作名稱：Holding apparatus for a rod)

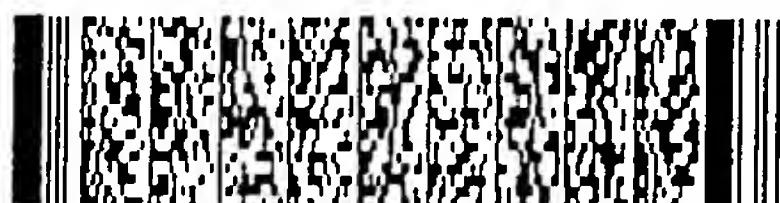
The holding apparatus is disposed outside of a rod, and comprises a holder having a heat sink substrate with fins to be provided with the large heat exchange area. The space between the holder and rod is filled with thermal conductivity substances to reduce the heat contact resistance. The heat of rod is conducted to the holder by the conductivity substances, and then the heat of holder is taken out by natural or forced convection. Thus it can enhance the cooling efficiency and reduce the heat contact.



四、中文創作摘要 (創作名稱：積分柱承托裝置)

陸、英文創作摘要 (創作名稱：Holding apparatus for a rod)

resistance.



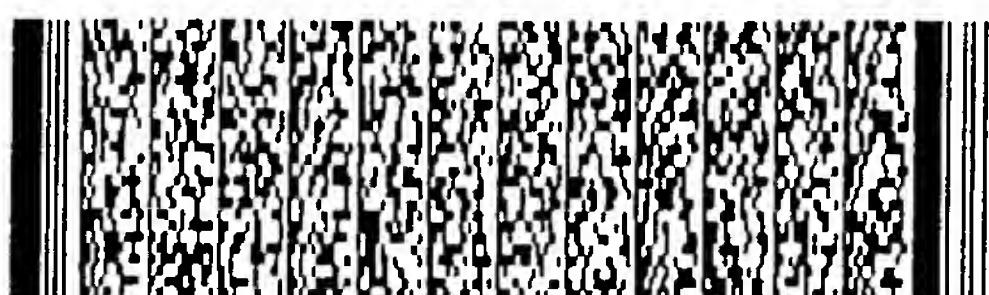
四、中文創作摘要 (創作名稱：積分柱承托裝置)

伍、(一)、本案代表圖為：第 2 圖

(二)、本案代表圖之元件代表符號簡單說明：

積分柱承托裝置	1	0
承托件	1	1
散熱基板	1	1
散熱鰭片	1	1
第一填膠孔	1	1
第二填膠孔	1	1
導熱物質	1	2
熱管	1	3
蒸發端	1	3
冷凝端	1	3

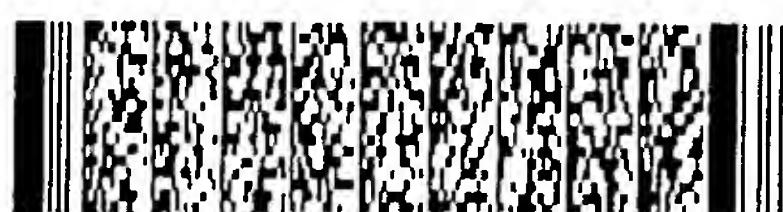
陸、英文創作摘要 (創作名稱：Holding apparatus for a rod)



四、中文創作摘要 (創作名稱：積分柱承托裝置)

散熱裝置	1 4
積分柱	2 0

陸、英文創作摘要 (創作名稱：Holding apparatus for a rod)



一、本案已向

國家(地區)申請專利

申請日期

案號

主張專利法第一百零五條準用
第二十四條第一項優先權

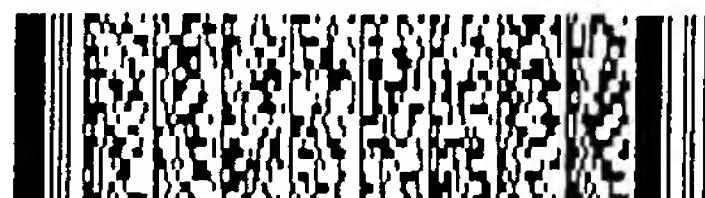
二、主張專利法第一百零五條準用第二十五條之一第一項優先權：

申請案號：

日期：

三、主張本案係符合專利法第九十八條第一項第一款但書或第二款但書規定之期間

日期：



五、創作說明 (1)

【新型所屬之技術領域】

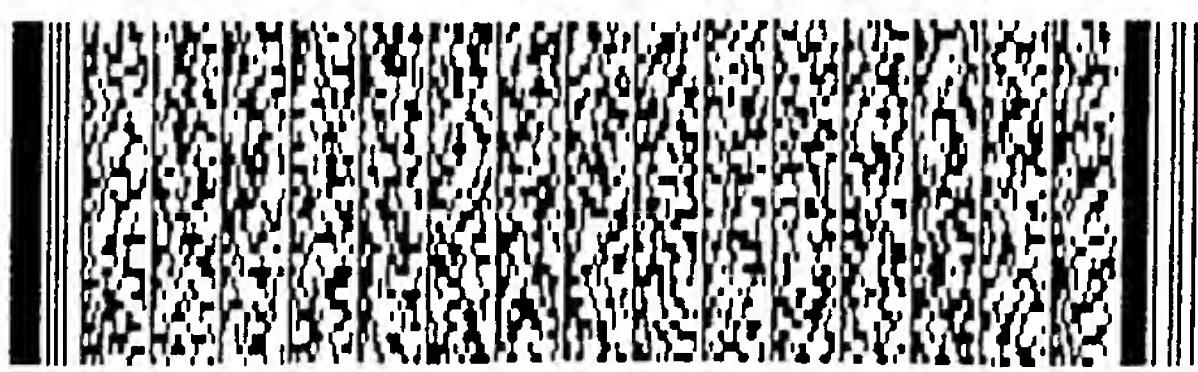
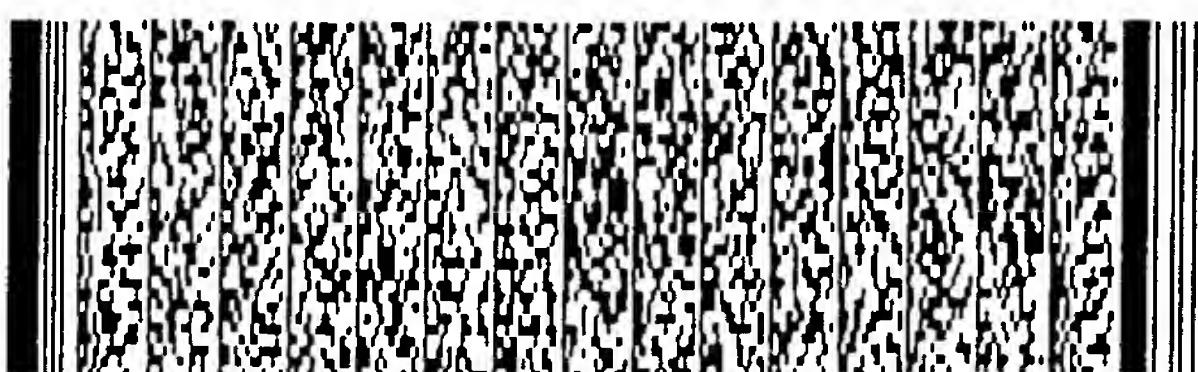
本創作係有關積分柱，尤其係指一種可承托積分柱及強化散熱效果之積分柱承托裝置。

【先前技術】

請參閱第1圖所示，習知積分柱1 (Optical integration rod) 係利用玻璃基板相互搭接並黏著而形成一中空柱狀，並於積分柱1內壁鍍有反射膜，使進入積分柱1之光束可經反射膜作多次反射，達到均勻光束；而積分柱1裝設於光學系統內需搭配承托件2以防止破壞結構及達到光學定位要求，且系統需具有散熱機制來移除強烈光束累積於積分柱1之熱能，使積分柱1維持最佳光學工作溫度。

習知積分柱1採用之承托件2係為一中空柱狀之鋁金件，包覆於積分柱1外側，並藉由紫外線(Ultra Violet, UV) 固化膠與積分柱1黏著固定，再利用調整及夾具裝置固定積分柱1於正確光路徑位置。而表面前會減少積分柱1於調整過程中受力，一般承托件2接觸面積，同時之開孔3，以減少承托件2與積分柱1之接觸面積並搭配系統之強制對流為UV固化膠之注入孔，而且藉由開孔3並產生強制對流，可帶走積分柱1之散熱量，來達到散熱目的。

習知積分柱1散熱雖利用空氣作為傳導媒介導出積分柱1之熱量，但由於空氣之傳導係數較固體低故接觸熱阻高，使得散熱效率較差；因此為了增加散熱效率或



五、創作說明 (2)

熱量無法有效排出時，係採用強制對流方式，即增設風扇加強對流，但風扇轉動會產生噪音，干擾觀賞環境，且積分柱 1 為玻璃材質其傳導係數低，故風扇直接對積分柱 1 散熱，其帶走之熱量有限；因此，利用習知之開孔 3 或增設風扇產生強制對流之方式，均無法有效達到散熱。

【新型內容】

本創作之一目的，係提供一種積分柱承托裝置，利用外表面具有散熱功能設計之承托件，及注入導熱物質能夠有效地經由導熱物質、承托件而散逸至冷卻流體，進而提高散熱效率。

本創作之另一目的，係提供一種積分柱承托裝置，可使相同尺寸之承托件適用於各種尺寸之積分柱，以提高使用彈性，降低零件成本。

本創作之又一目的，係提供一種積分柱承托裝置，可利用熱管之設置，將積分柱之熱量傳送至較佳之自然對流或強制對流的位置，以增強散熱效果。

為達上述目的，本創作之積分柱承托裝置係設置於一積分柱外側，其包括一外表面具有鰭片與積分柱間隙，該承托件可為散熱物質，積分柱之熱量可藉由導熱方式將熱量傳導至承托件再利用自然對流或強制對流方式將熱量帶走而達到散熱；另外可增設熱管一端連接於承托件，



五、創作說明 (3)

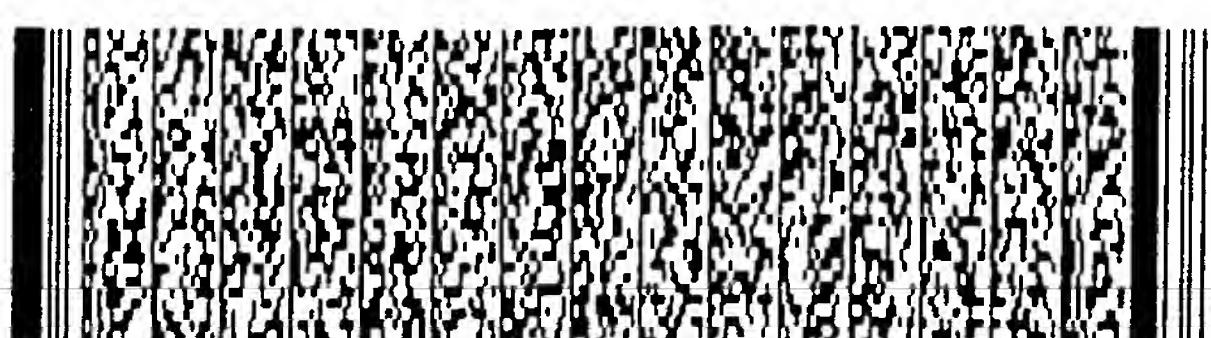
另一端連接散熱裝置，藉由熱管的特性可將積分柱之熱量傳送至較佳之自然對流或強制對流的位置以達到散熱要求。

【實施方式】

有關本創作為達到上述目的，所採用之技術手段及其餘功效，茲舉下列較佳實施例，並配合圖式加以說明如下：

請參閱第2圖所示，本創作之積分柱承托裝置10其包括一承托件11，承托件11係設置於一積分柱20間充填有導熱物質12；該承托件11之形狀可依空空間及積分柱20形狀而設，本實施例配合積分柱20而設為一中空柱體，其中空部分供積分柱20安置，該承托件11由散熱基板111及複數個鰭片112所組成，該散熱基板111係由高熱傳導係數材質製成，如鋁、銅等，散熱基板111兩表面外側設有平面112以利調整裝置或夾具夾持。一

然鰭片112可設置於散熱基板111之表面，其數量與大小係根據區域效率率，可依此之傳導率，據此可多增設鰭片112，以增加熱交換面積及散熱基板111之散熱能力（如第3圖所示）、一側面（如第4圖所示）或由散熱基板111一端延伸形成（如第5圖所示）等。

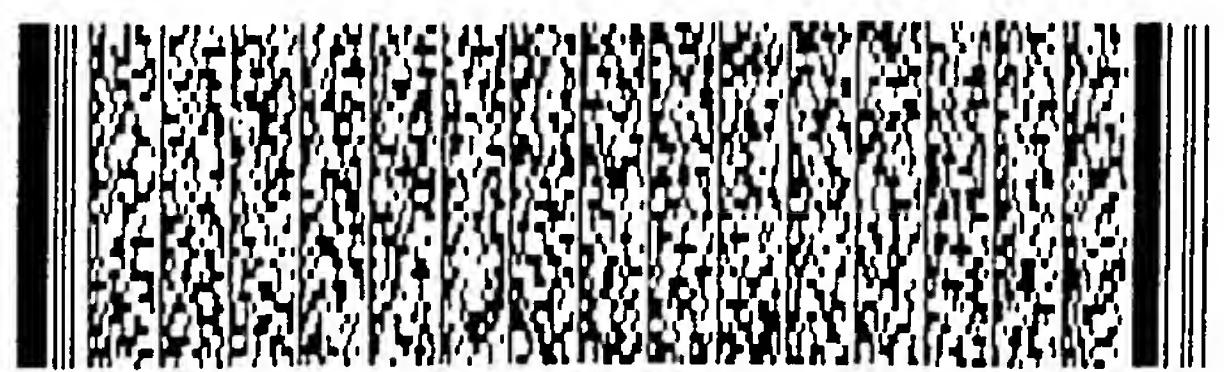
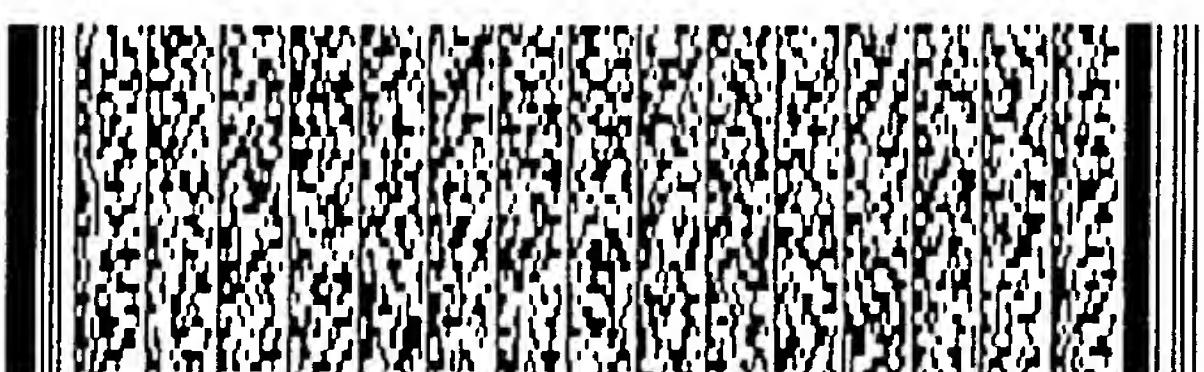


五、創作說明 (4)

請續參第2圖，該承托件11之表面開設有至少一
第一填膠孔113及第二填膠孔114，使較高黏性之
黏膠（如UV固化膠）可由第一填膠孔113注入後，將
承托件11與積分柱20黏著固定，而導熱物質12（
如導熱膠或導熱膏等）可由第二填膠孔114注入後，
填充於積分柱20與承托件11間之間隙內，因此，藉各
由填充導熱物質12可使相同尺寸之承托件可適用於本同
種尺寸之積分柱，而提高使用彈性，降低零件傳導效果。
時導熱物質12又可降低接觸熱阻並增加傳導效果。

積分柱 20 之熱量可透過導熱物質 12 傳導至承托件 11 及外側鰭片 112，再藉由系統內之自然對流帶走承托件 11 之熱量達到散熱，由於本創作係藉由導熱物質 12 將積分柱 20 之熱量導出至承托件 11，再進行散熱，其傳導效果較習知之流體作為傳導媒介為佳，且不直接對積分柱 20 散熱，而將熱導至高傳導係數，且熱交換面積較大之承托件 11，再進行散熱，因此，可增加散熱效率。另外亦可以配合強制對流方式增強熱交換現象，而提高散熱效果。

請參閱第6圖所示，係將本創作與習知積分柱承托裝置，分別裝設於同一光學系統內，並於積分柱20入口、中心、出口設置A、B、C之溫度量測點，再開機使用30分鐘後進行溫度量測，測試數據例如第7圖所示；當於積分柱20外側有加裝一驅動電壓為8V之風扇狀態下，本創作於量測點A與B溫度約可降低 20°C ，量



五、創作說明 (5)

測點C溫度約可降低38°C；而當積分柱20外側無加裝風扇狀態下，本創作於量測點A與B溫度約可降低65°C，量測點C溫度約可降低106°C；由實驗數據可知，採用本創作之積分柱承托裝置，可大大降低積分柱之溫度，而提供較佳散熱效果。

另外，當由於積分柱附近之空間有限或者是由於防塵需求，侷限了冷卻設計空間時，可利用設置熱管(Heat pipe)13方式，將承托件11之能量傳送至自然對流較佳或可設置強制對流之位置進行散熱，請參閱第8圖所示，係將一熱管13之蒸發端131連接於承托件11，冷凝端132連接於一散熱裝置14，該散熱裝置14可為一具有鰭片之散熱片或低溫水槽(圖未示)等，藉由熱管13將承托件11之熱量傳導至散熱裝置14，再進行冷卻來達到散熱目的。

以上所述，僅用以方便說明本創作之較佳實施例，本創作之範圍不限於該等較佳實施例，凡依本創作所做的任何變更，於不脫離本創作之精神下，皆屬本創作申請專利範圍。



圖式簡單說明

【圖式簡要說明】

第1圖，係習知積分柱與固定件之組合圖。

第2圖，係本創作第一實施例積分柱承托裝置之結構圖。

第3圖，係本創作第二實施例積分柱承托裝置之結構圖。

第4圖，係本創作第三實施例積分柱承托裝置之結構圖。

第5圖，係本創作第四實施例積分柱承托裝置之結構圖。

第6圖，係本創作量測點之位置示意圖。

第7圖，係本創作與習知積分柱之溫度比較圖。

第8圖，係本創作採用熱管之積分柱承托裝置結構圖。

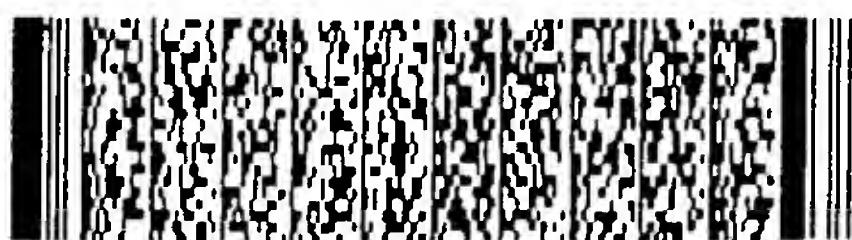
【圖號簡要說明】

積分柱承托裝置	1 0
承托件	1 1
散熱基板	1 1 1
散熱鰭片	1 1 2
平面	1 1 2 1
第一填膠孔	1 1 3
第二填膠孔	1 1 4
導熱物質	1 2
熱管	1 3



圖式簡單說明

蒸發端	1	3	1
冷凝端	1	3	2
散熱裝置	1	4	
積分柱	2	0	
量測點	A	、	B 、 C



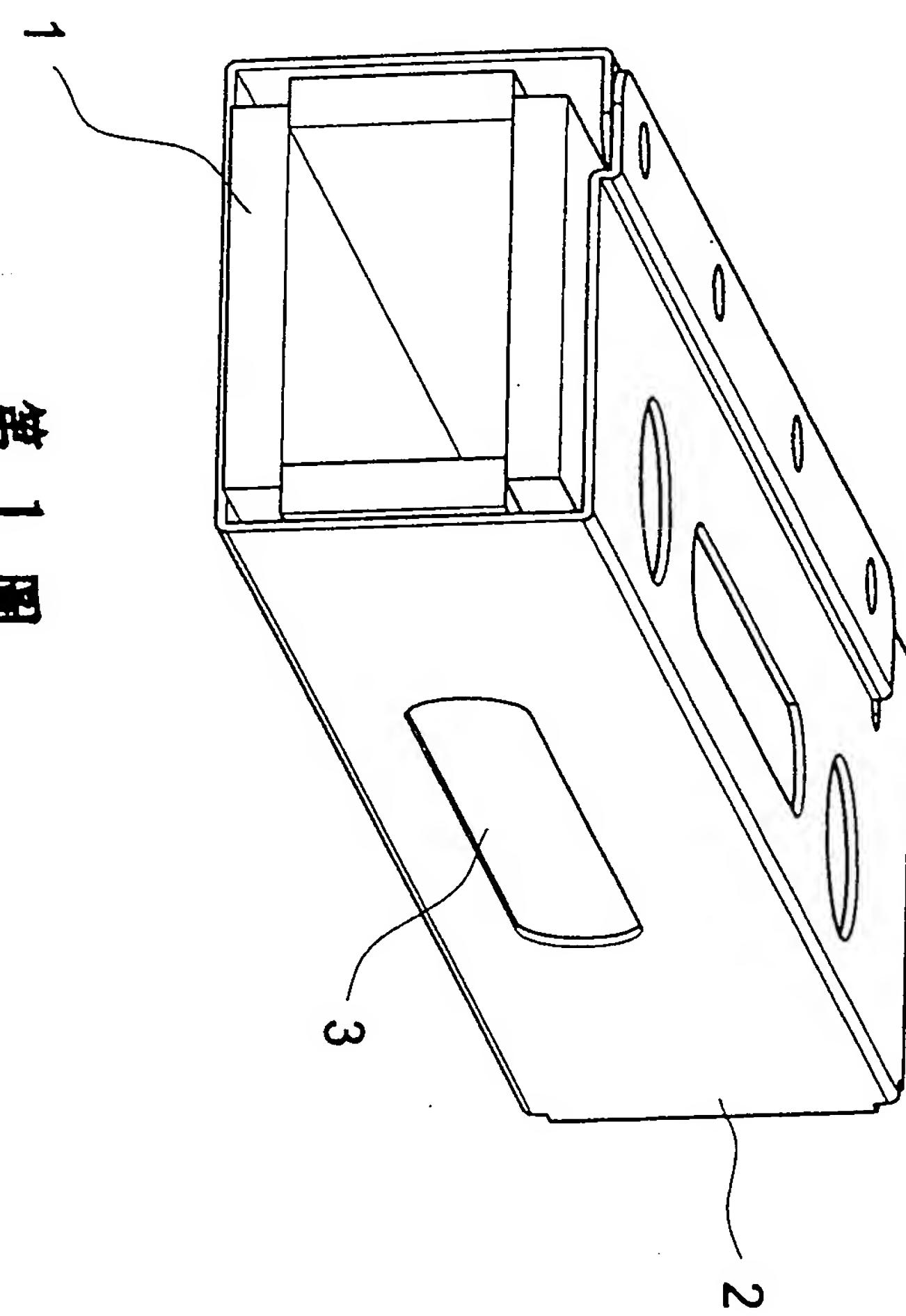
六、申請專利範圍

- 1、一種積分柱承托裝置，其包括：
一承托件，係設於該積分柱外側，且該承托件與積分柱間充填有導熱物質。
- 2、如申請專利範圍第1項所述之積分柱承托裝置，其中該承托件為一散熱基板。
- 3、如申請專利範圍第2項所述之積分柱承托裝置，其中該散熱基板係為高熱傳導係數材質。
- 4、如申請專利範圍第2項所述之積分柱承托裝置，其中該散熱基板上設有散熱鰭片。
- 5、如申請專利範圍第4項所述之積分柱承托裝置，其中該散熱鰭片可設於散熱基板之至少一側。
- 6、如申請專利範圍第1項所述之積分柱承托裝置，其中該承托件係為一中空柱體。
- 7、如申請專利範圍第1項所述之積分柱承托裝置，其中該承托件表面設有至少一填膠孔。
- 8、如申請專利範圍第1項所述之積分柱承托裝置，其中該承托件連接於一熱管之一端，另一端連接一散熱裝置。
- 9、如申請專利範圍第8項所述之積分柱承托裝置，其中該散熱裝置可為一散熱片。

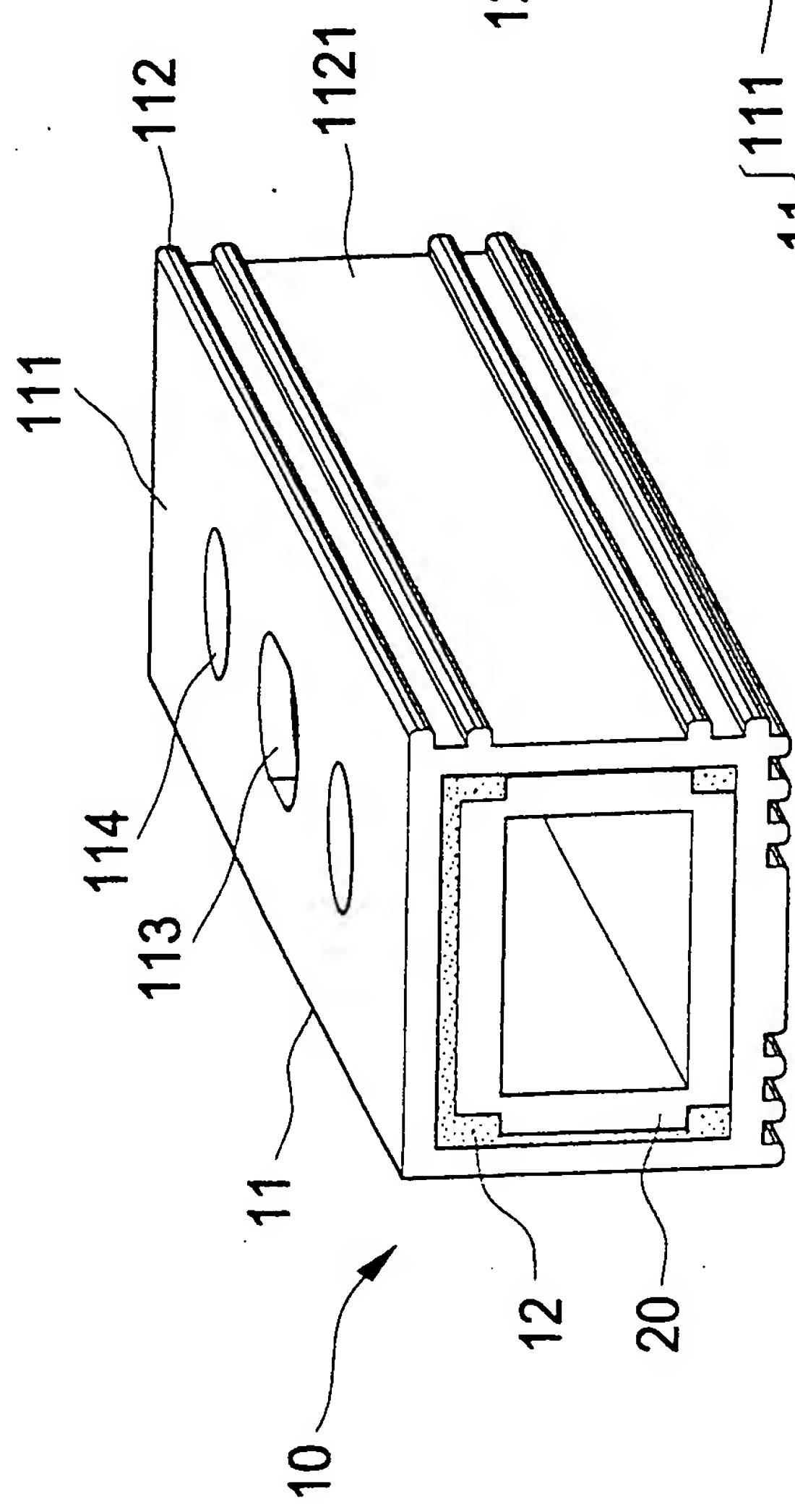


圖式

第 1 圖

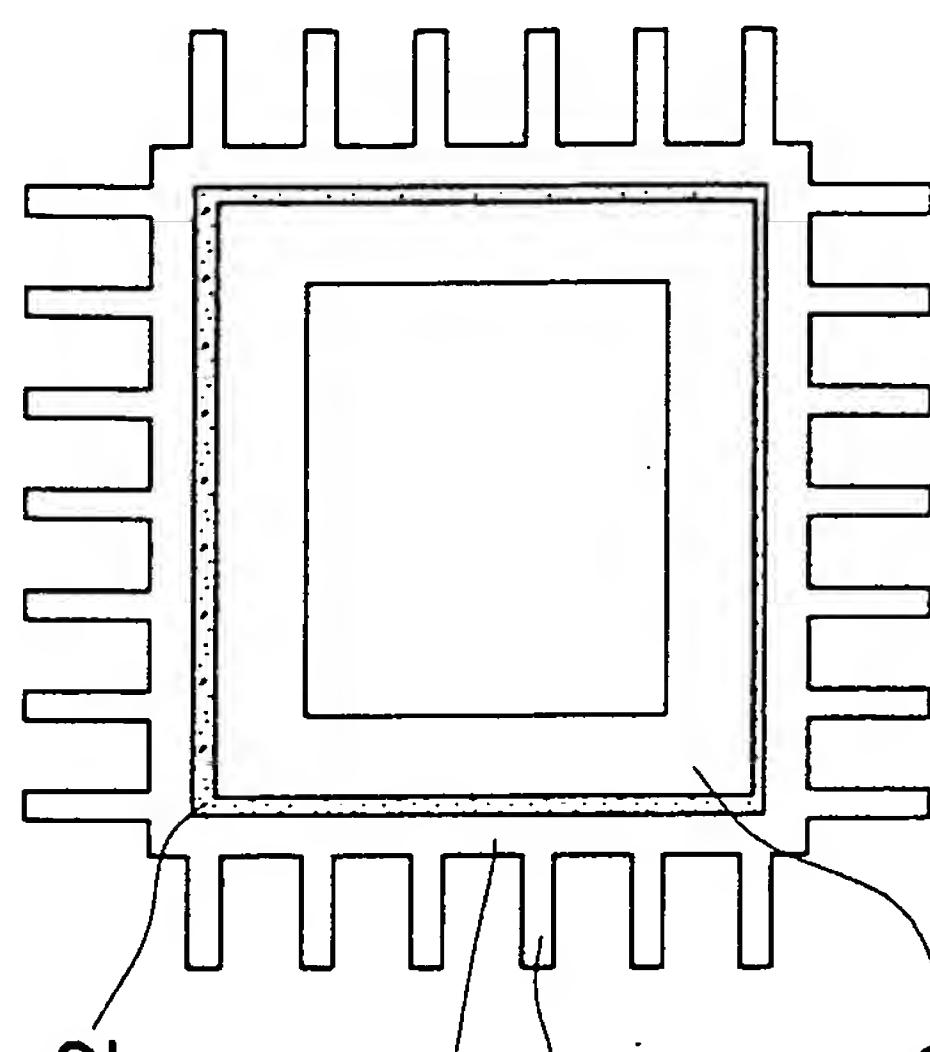


第2圖



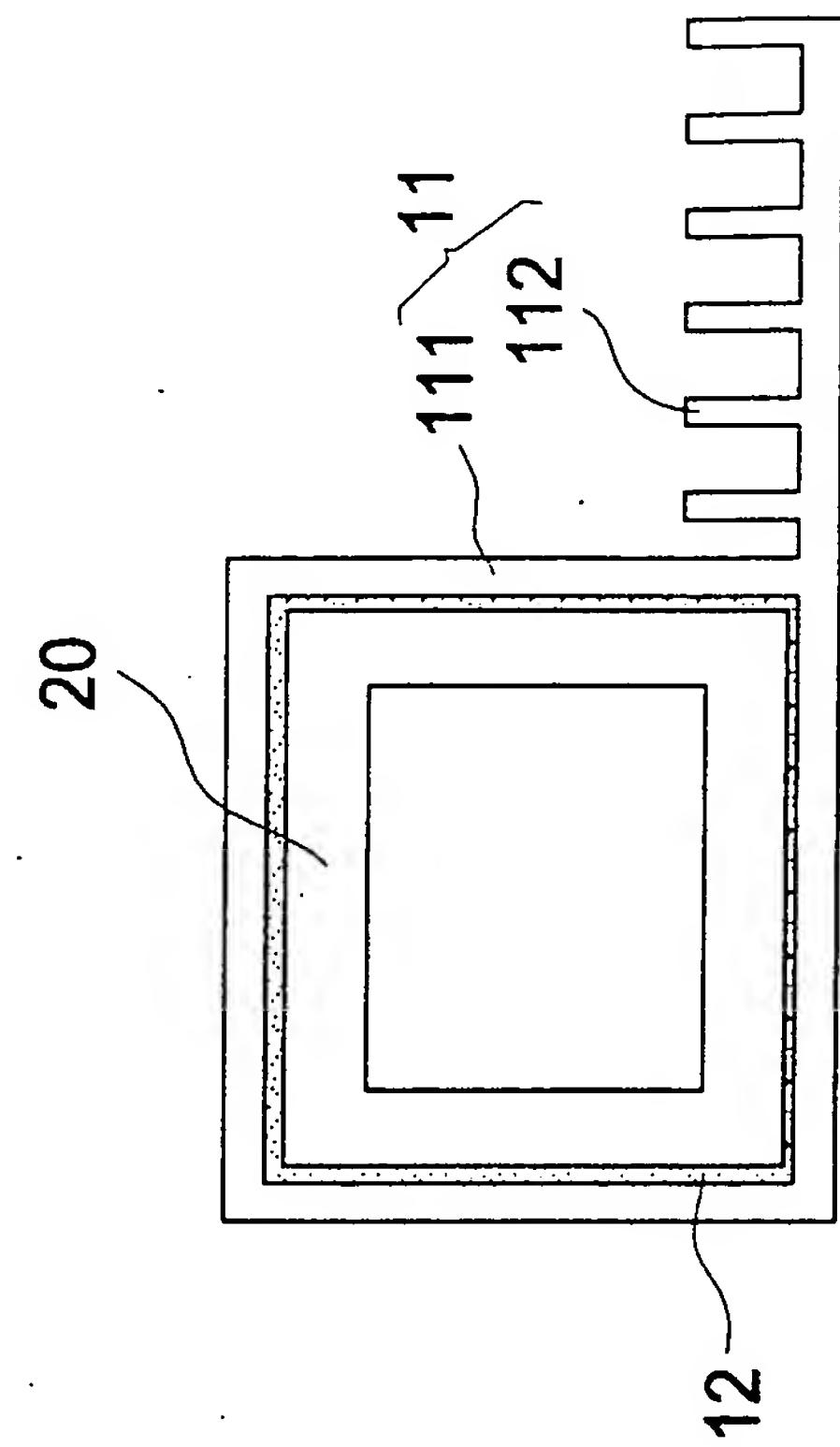
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第3圖

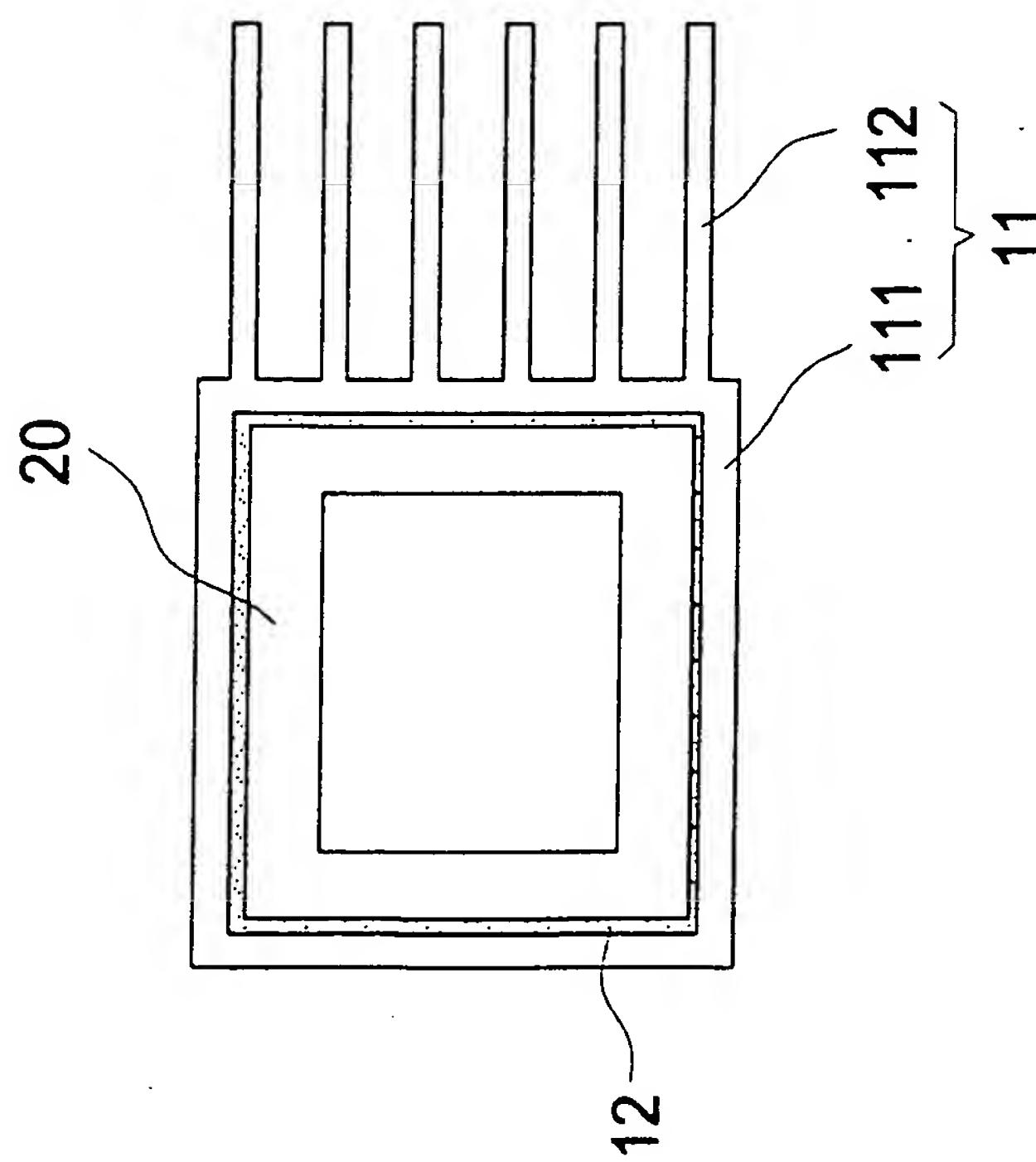


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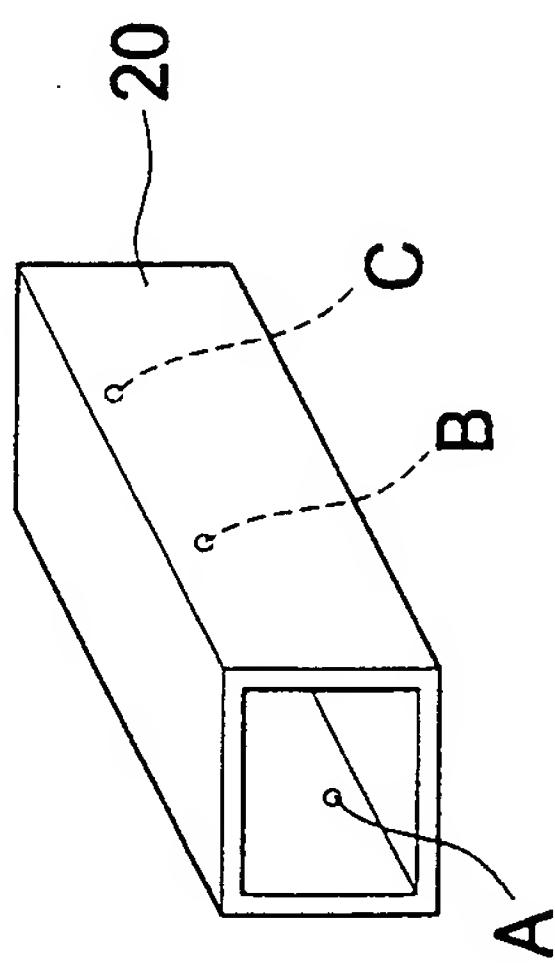
第 5 圖



第 4 圖

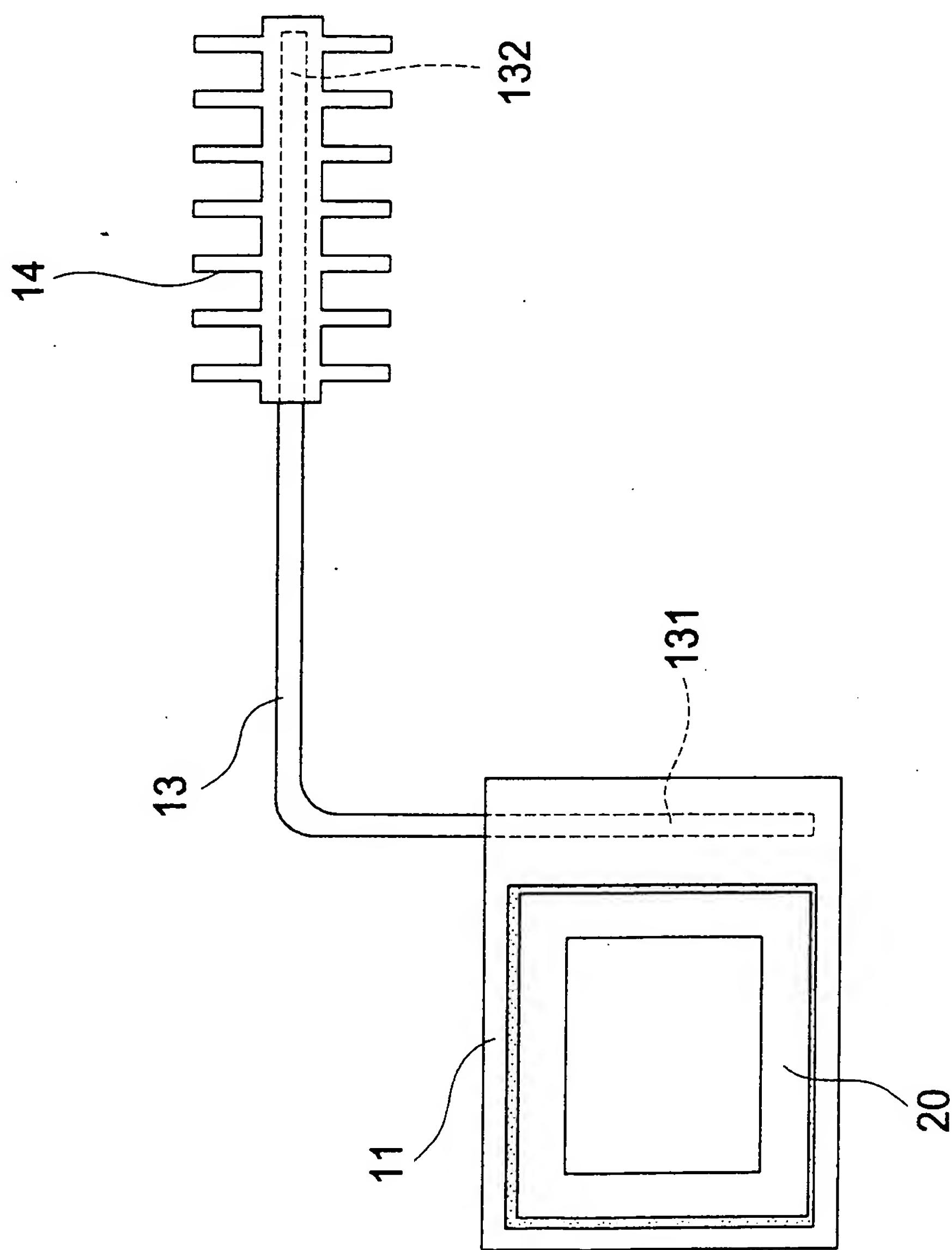


量測位置 條件	外加風扇		無風扇	
	本創作	習知	本創作	習知
A	103.4°C	128.2°C	147.8°C	213.3°C
B	92.4°C	111.7°C	128.1°C	190.6°C
C	88.2°C	126.3°C	151.2°C	258.1°C



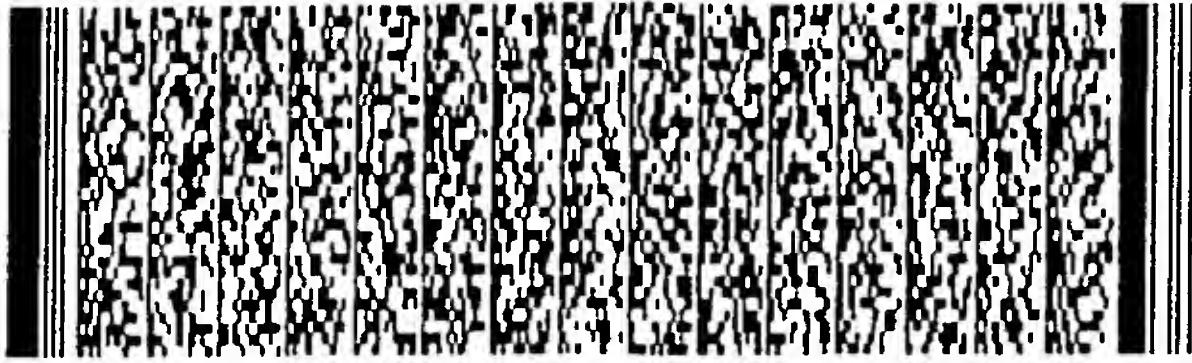
第 6 圖

第 7 圖

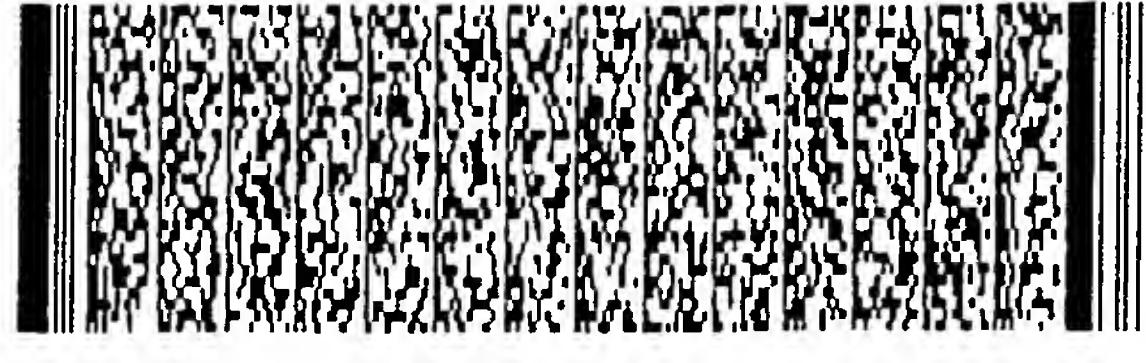


第8圖

第 1/14 頁



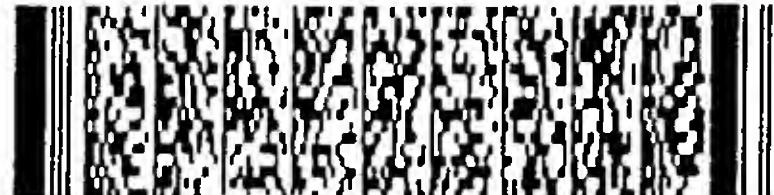
第 2/14 頁



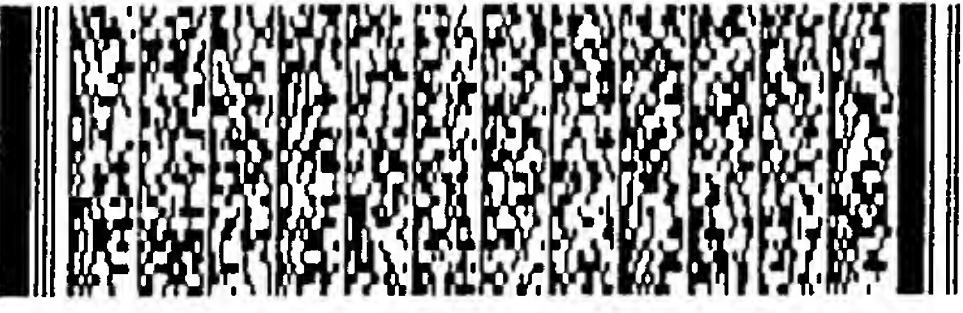
第 2/14 頁



第 3/14 頁



第 4/14 頁



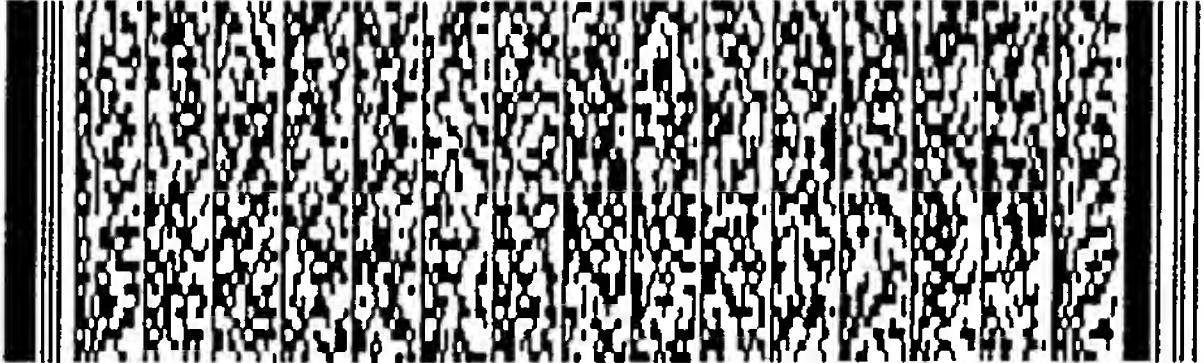
第 5/14 頁



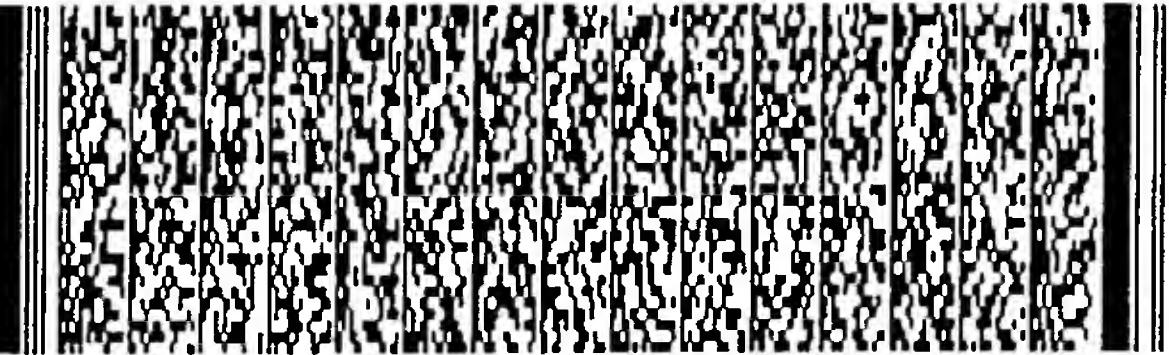
第 6/14 頁



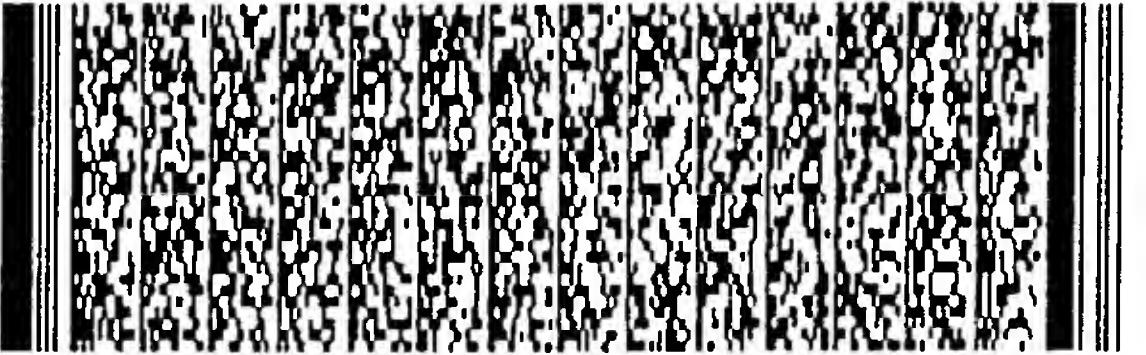
第 7/14 頁



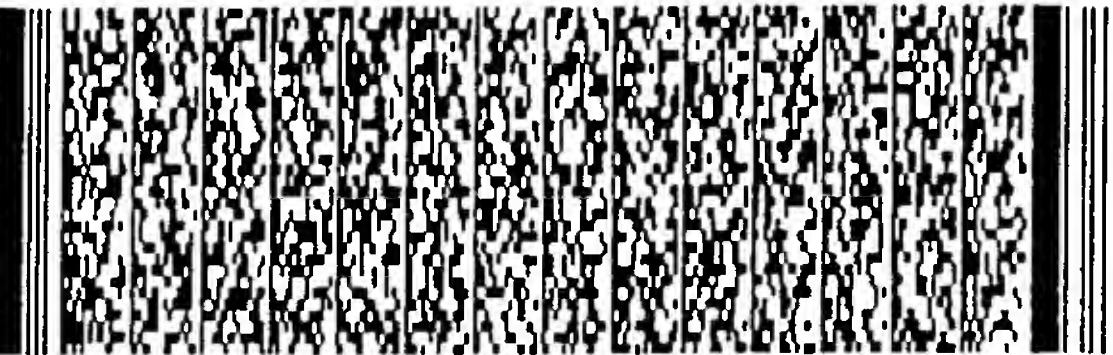
第 7/14 頁



第 8/14 頁



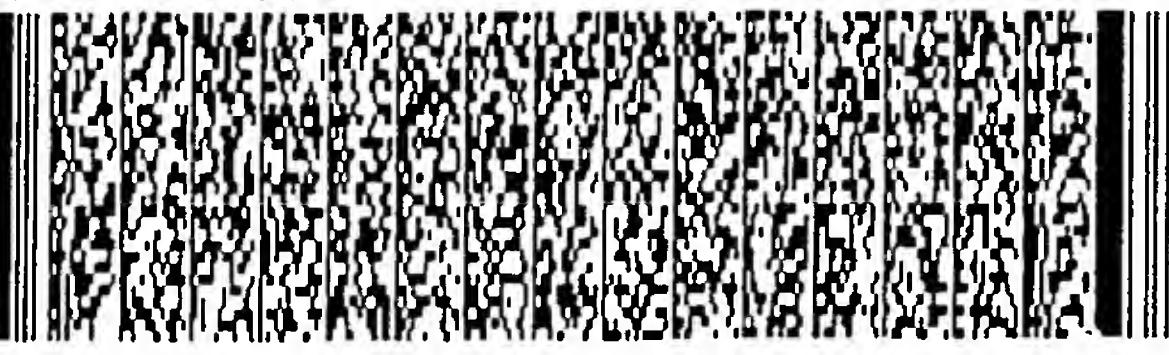
第 8/14 頁



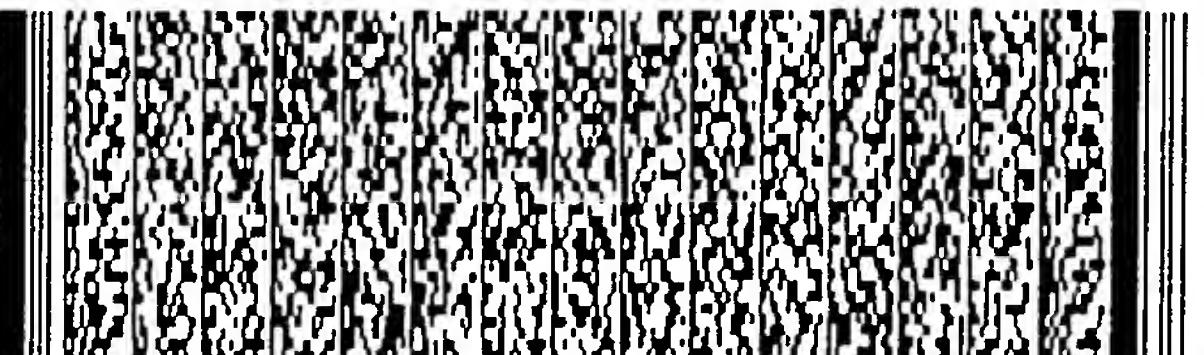
第 9/14 頁



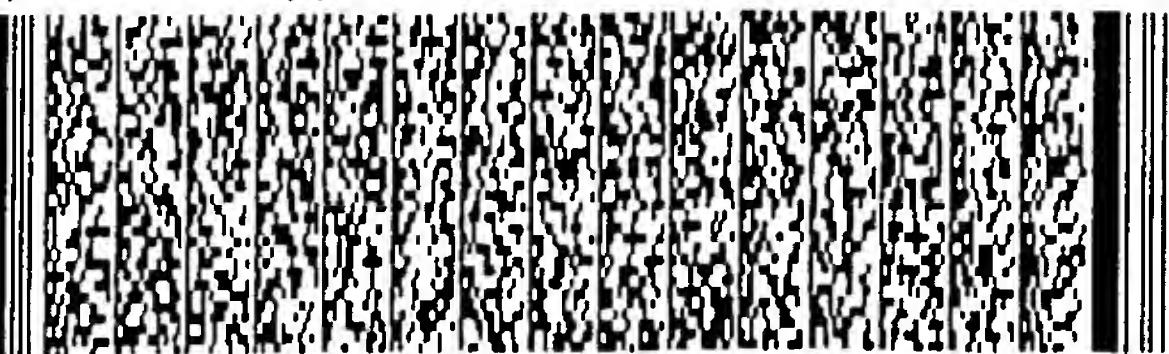
第 9/14 頁



第 10/14 頁



第 10/14 頁



第 11/14 頁

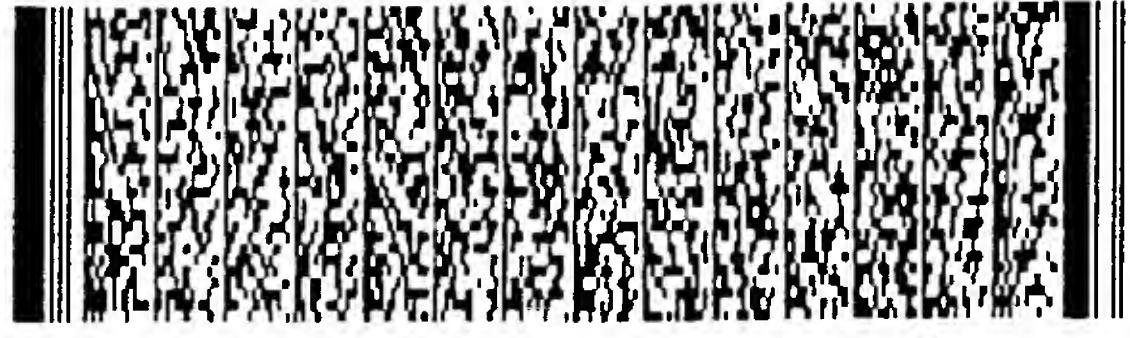


申請案件名稱:積分柱承托裝置

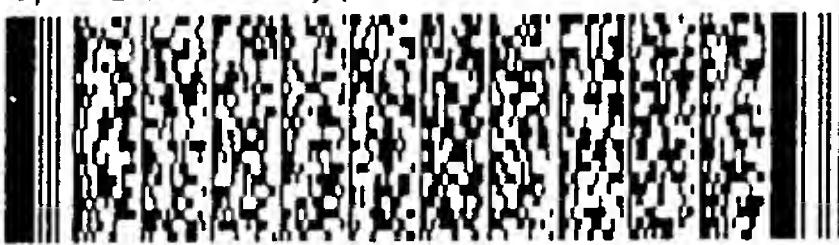
第 11/14 頁



第 12/14 頁



第 13/14 頁



第 14/14 頁

